TITLE: IMPROVED WASHING MACHINE WITH TILT-OUT LAUNDRY ASSEMBLY

BACKGROUND OF THE INVENTION

Top loading washing machines have a laundry assembly that may be occasionally serviced. During service, the laundry assembly which is usually suspended within the washing machine is removed. Typically, the suspended laundry assembly is removed by a service person who must lift the entire suspended laundry assembly upward vertically approximately 4 inches to clear all of the other components in the washing machine and then, while the laundry assembly is still elevated, the operator must pull it forward, maneuver it past the cabinet brackets, and out of the cabinet and then placed upon the floor. This servicing is awkward because the person must lean over the top of the machine with his/her feet off of the base frame to insure that no damage occurs to the base frame. In addition, the laundry assembly is 77 pounds in weight and difficult to move without proper leveraging. In addition, the prior art position may be alleviated upon using ergonomic industrial design considerations.

Therefore, a primary objective of the present invention is the provision of an improved washing machine that facilitates ergonomic removal of suspended laundry assemblies. A further objective of the present invention is the provision of a tilting feature and method of using same which moves the laundry assembly from an upright operate position to a tilt remove position to facilitate removal of the laundry assembly without the risk of damage to the washing machine from incorrect removal, accidental droppings, or the service person accidentally stepping upon the base frame.

A further objective of the present invention is the provision of a ball and socket joint between the laundry assembly and struts supporting the laundry assembly to provide for proper tilting of the laundry assembly.

A further objective of the present invention is the provision of an improved washing machine with tilt-out laundry assembly which is economical to manufacture, durable in use and efficient in operation.

BRIEF SUMMARY OF THE INVENTION

The foregoing objectives may be achieved by an improved washing machine with a cabinet with a laundry assembly suspended within. The laundry assembly is suspended by front standing struts having an upper end attached to the laundry assembly and a lower end attached to a base of the cabinet. The laundry assembly is also suspended by removable rear struts having one end attached to the cabinet and a second end attached to the rear side of the laundry assembly. A tiltable joint is provided between the front standing struts upper end and the side of the laundry assembly that permits the laundry assembly to move between an upright position to a tilt remove position.

According to another feature of the present invention the tiltable joint is a ball and socket joint. This ball and socket joint has a recess in the socket that permits the laundry assembly to move from the upright position to the tilt position. The recess prevents a rod of the front standing strut from interfering with the rotation of the ball within the socket.

According to another feature of the present invention a corresponding recess is placed within the support molding of the front side of the laundry assembly and a recess provided in a cushion that engages the front standing strut. These additional recesses also prevent the rod from interfering with the rotation of the ball within the socket and permit the laundry assembly to tilt from an operational position to a remove position. The foregoing objectives may also be achieved by a method of servicing an improved washing machine with a tilt-out laundry assembly as described including removing the rear struts from the rear side of the laundry assembly, tilting the laundry assembly about the front standing struts, and removing the laundry assembly from the cabinet.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective of an improved top loading, vertical axis washing machine in an upright operate position.

Figure 2 is a perspective view of the washing machine of Figure 1 in a tilt remove position.

Figure 3 is an exploded view showing the interconnection between the laundry assembly and the ball and socket joint.

Figure 4 is a front view of the ball and socket joint connecting the front arm of the laundry assembly to the front strut with the laundry assembly in an upright position.

Figure 5 is a bottom view of the ball and socket joint joining the front arm and the front standing strut with the front arm tilted about the front standing strut when the laundry assembly is in a tilted position.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Figure 1, a washing machine 10 includes a cabinet 12 having a base 14 and base frame 16. The cabinet 12 also has side panels 18, rear panel 20 and a removable front cover (not shown). The side panels 18 and rear panel 20 are attached to the base and are designed to be load bearing. The cabinet 12 has a lift up top 22 that provides easy access to the laundry assembly 24.

The present invention is directed towards the tilt-out laundry assembly 24. The laundry assembly 24 has a front side 26 and a rear side 28. Upon the front side 20 are a pair of front arms 30 and upon the rear side 28 are a pair of rear arms 32. The laundry assembly 24 is suspended within the cabinet 12 by front standing struts 34 and removable rear struts 36. The front standing struts 34 have an upper end 38 operably attached to the front arm 30 on the front side 26 of the laundry assembly 24. In addition, the front standing struts 34 have a lower end 40 that is attached to the base 14. The front standing strut 34 has a cylinder 42 with an extensible rod assembly 44 connected thereto. The cylinder 42 may have a spring or compressible fluid which provides dampening to the rod assembly 44 in response to vibrations which may come from the laundry assembly 24.

The removable rear struts 36 are operably attached to the cabinet 12 by bracket 46 and removably attached to the rear arms 32 by member 48. The removable rear struts 36 typically use a continuous rod.

As seen between Figures 1 and 2, the laundry assembly 24 may be tilted outward by pivoting between the front arms 30 and the front standing strut 34. In order to move the laundry assembly 24 from the upright operate position as seen in Figure 1 to the tilt remove position as seen in Figure 2, the user must remove the removable rear struts 36 from the rear side 28 of the laundry assembly 24, tilt the laundry assembly 24 about the front standing struts 34, and then remove the laundry assembly 24 from the cabinet 12.

As seen in Figure 2, the laundry assembly may be tilted 90° from vertical such that the hand grip 52 is the same height off of the ground as an upper portion or rim 54 of the laundry assembly 24. The user can then grip the hand grip 52 and the rim 54 and pull upward. The upward movement by the user disengages the front arms 30 from the front standing struts 34. Alternatively, the upward movement by the user pulls the rod 44 from within the cylinder 42 so as to detach the laundry assembly 24 from the front standing struts cylinder 42. The user is then free to place the laundry assembly 24 upon the ground either sideways or in an upright standing position. In order to access the laundry assembly 24 for tilting and removal a service person will remove a front panel (not shown) of the washing machine 10 and pivot the top panel 22 upward.

Figure 3 illustrates an exploded close-up view of the interconnection of the front side 26 of the laundry assembly 24 and the front strut 34. As seen in Figure 5, the interconnection is a tiltable joint specifically in the form of a ball and socket joint 56 having a ball 58 attached to the rod 50 of the front strut 34. The socket 60 is formed in a removable piece 62 that may be secured to a female receptacle 64 in front arm 30 by male insert 65.

The socket 60 has a recess 66 that permits rotation of the laundry assembly 24 beyond a point where the rod 50 would strike a sidewall of the socket 60.

Attached and surrounding the socket is a cushion 68 which dampens vibrations from the laundry assembly 24 when the laundry assembly 24 is in use. The cushion 68 has a recess 70 in alignment with the socket recess 66 to permit rotation of the laundry assembly 24 past where the cushion would interfere with pivotal movement.

The front arm 30 has support molding 72 that provides strength to the front arms 30. The front arms 30 has a recess 74 in the support molding 72 to prevent travel of the rod 44 of the front standing strut 34 and permit the laundry assembly 24 to move from the upright position to the tilt position. Thus, the socket recess 66, the cushion recess 70, and the support molding recess 74 all work together to permit the laundry assembly 24 to move from the upright position to the tilt position.

Figure 4 shows the tiltable joint 56 when the laundry assembly is in the upright position. The ball 58 engages the socket 60. In operation, the ball 58 can pivot within the socket 60 approximately 20° before the rod 44 strikes cushion 68. Additionally, the rod 44

may slip inside the cylinder 42 so the combination of dampening between the cushion 68 and cylinder 42 reduce vibrations which may come from the laundry assembly 24.

As further seen in Figure 4, the socket recess 66, the cushion recess 70 and the support molding recess 74 are all in alignment such that the laundry assembly 24 may pivot from an upright position to a tilt position as seen in Figure 5. Figure 5 is an illustration of the underside of the front arm 30 showing the laundry assembly 34 in a tilt position such that it strikes the rod 50 at a right angle. In this position, the rod 50 is placed within the socket recess 66, the cushion recess 70 and the support molding recess 74. As seen most clearly in Figure 1, the tiltable joint 56 when used as a pair must be aligned such that tilting of the laundry assembly 24 places the rod 44 in alignment with the recesses 66, 70, 74. In normal operation, there is no risk of the laundry assembly 24 from moving into the recesses because the recesses take only a small portion of the circumference of the socket 60 and cushion 68, the laundry assembly must be moved in a tilting fashion towards the recesses as opposed to the random oscillation of the laundry assembly in use, and the removable rear struts 36 also prevent forward movement of the laundry assembly 24 past a point in which the rod 44 will be received by the recesses 66, 70, and 74.

The angle of movement from the upright position to the tilt position should be between 45 to 90° to provide the service person with enough tilt to easily remove the laundry assembly. In the preferred embodiment the angle of movement from the tilt position is between 75 to 90°. Most often, the service person will rotate the laundry assembly 24 to a right angle position before lifting and removing the laundry assembly 24.

In an alternative embodiment, the invention may be employed in a horizontal axis washer. In this case, the axis of the laundry assembly 24 is horizontal in the upright operate position.

In the drawings and specification there has been set forth a preferred embodiment of the invention, and although specific terms are employed, these are used in a generic and descriptive sense only and not for purposes of limitation. Changes in the form and the proportion of parts as well as in the substitution of equivalents are contemplated as circumstances may suggest or render expedient without departing from the spirit or scope of the invention as further defined in the following claims.